TETRA TECH

July 18, 2019

Mr. Ken Rhame
On-Scene Coordinator
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

Subject: **Emergency Response Letter Report**
American Zinc Products Fire
Mooresboro, Rutherford County, North Carolina
Contract Number: EP-S4-14-03
TDD Number: TT-01-116

Dear Mr. Rhame:

The Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) submits this report summarizing the emergency response activities conducted from April 29 to April 30, 2019 at the American Zinc Products Fire in Mooresboro, Rutherford County, North Carolina. This report includes five enclosures and one attachment. Enclosure 1 contains figures illustrating the site location, site layout, and air monitoring and surface water sample locations. Enclosure 2 contains mobile and VIPER air monitoring summary tables and surface water sample summary tables. Enclosure 3 contains a photographic log of the response activities. Enclosure 4 contains a copy of the START logbook notes. Enclosure 5 contains the Tetra Tech Stage 2A data validation report. Attachment 1 contains the laboratory analytical data package.

BACKGROUND

On April 28, 2019, at 2059 hours, Ms. Aili Spearman of American Zinc Products (AZP) reported an industrial fire to the National Response Center (NRC) (Incident Report Nos. 1244000 and 1244002). Local firefighters responded to a facility fire at the AZP site located at 484 Hicks Grove Road in Mooresboro, Rutherford County, North Carolina (see Figure 1 in Enclosure 1). The geographic coordinates of the site are latitude 35.1916330 degrees north and longitude 81.8488390 degrees west. Woodland areas are located directly north, east, and west of the site, with the Broad River located directly north of the site. A residential neighborhood is located to the northeast of the site. A church, residential neighborhoods, and commercial businesses are located to the south and southwest of the site. See Figure 2 in Enclosure 1 for the site layout.

The AZP site produces zinc metal, lead-silver concentrate, and other co-products using solvent extraction, Electrowinning, and novel brine-leach/precipitation technologies. On April 28, 2019, at approximately 1930 hours, a fire started at a tank outside of the "Cell House." The tank reportedly contained approximately 4,700 gallons of solution containing sulfuric acid, manganese, and dissolved zinc with electrolytes. The fire spread into the "Cell House" with a 600,000 gallon basement containing lead anodes and an electrolyte solution composed of 17 percent (%) sulfuric acid, 5% zinc, and 0.17% manganese. During firefighting activities, Rutherford County Emergency Management (RCEM) advised an evacuation of the residences within a half-mile of the site due to concerns regarding smoke and air

emission from the site. Also, portions of Highway 221 in North Carolina and South Carolina were closed.

Firefighters used approximately three million gallons of fire suppression water extinguishing the fire. Runoff from firefighting activities was briefly contained in a stormwater retention pond located north of the facility. Although the stormwater discharge valve was closed, responders from the North Carolina Department of Environmental Quality (NC DEQ) Water Resources observed a seep at the stormwater discharge point. NC DEQ determined the seeping water entering the Broad River was pH 1.8.

RESPONSE ACTIVITIES - AIR MONITORING

Late on the evening of April 28, 2019, EPA mobilized START personnel to assist with emergency response activities. START arrived on site at approximately 0550 hours on April 29. START met with the Unified Command (UC), comprised of U.S. Environmental Protection Agency (EPA) On-Scene Coordinator (OSC) Ken Rhame, NC DEQ, RCEM, and AZP personnel, at Floyd's Creek Baptist Church (FCBC) in Forest City, North Carolina. The UC discussed the details of the fire and actions being taken to manage the response. During the meeting, EPA tasked START to conduct mobile air monitoring in the neighborhoods downwind of the facility. Upon arrival at the facility, START observed visible flames and a plume of smoke from the fire in the southern and southwestern neighborhoods, while the local fire department continued to control and extinguish the fire.

On April 29, 2019, from 0700 hours to 1010 hours, START conducted mobile air monitoring in the southern and southwestern neighborhoods at seven locations (see Figure 3 in Enclosure 1). START monitored airborne concentrations of volatile organic compounds (VOCs), hydrogen sulfide (H_2S), carbon monoxide (CO), oxygen (O_2), and the lower explosive limit (LEL) using a RAE Systems MultiRAE Pro photoionization detector (PID) and sulfuric acid (H_2SO_4) concentrations using a Honeywell Single Point Monitor Flex Chemcassette Tape-Based Gas Detector (SPM Flex) (see Table 1 in Enclosure 2). Mobile air monitoring was conducted at the following locations (see Figure 3 in Enclosure 1):

- Northern side of Hicks Grove Baptist Church
- Home No. 7 on Providence Farm Drive
- 716 Hicks Grove Road
- The corner of Ford Road and Hicks Grove Road on the South Carolina Border
- The railroad crossing of the Hicks Grove Road Extension
- 227 Hicks Grove Road Extension
- The corner of Hicks Grove Road and Hick Grove Road Extension

On April 29, 2019, at 0930 hours, START conducted additional mobile air monitoring in the northeastern neighborhood at four locations . START monitored airborne concentrations of VOCs, H_2S, CO, O_2, and LEL using a MultiRAE Pro PID and H_2SO_4 concentrations using a SPM Flex (see Table 1 in Enclosure 2). Mobile air monitoring was conducted at the following locations (see Figure 3 in Enclosure 1):

- 150 South River Road
- 221 South River Road
- South River Road facility gate
- 127 Craig Road

START returned to FCBC to discuss air monitoring results with EPA. EPA informed START that AZP contracted the Center for Toxicology & Environmental Health, LLC (CTEH) to conduct air monitoring on site and around the community. EPA and START spoke with CTEH concerning their planned air monitoring activities and provided them with a list of previously-monitored, mobile air monitoring locations.

On April 29, 2019, at 1900 hours through April 30, 2019, at 0730 hours, EPA and START conducted stationary air monitoring at the fire department located on the western side of AZP adjacent to the facility entrance (see Figure 3 in Enclosure 1). START monitored airborne concentrations of VOCs, H_2S, O_2, LEL, and sulfur dioxide (SO_2) using a RAE Systems AreaRAE Steel PID and H_2SO_4 concentrations using a SPM Flex (see Table 2 in Enclosure 2).

On April 29, 2019, at 2000 hours through April 30, 2019, at 0100 hours, EPA continued mobile air monitoring in the northeastern, southern, and southwestern locations to assess potential changes to air quality during the night temperature inversion. EPA reduced monitoring in the northeastern residential area to the 150 South River Road and the South River Road facility gate locations due to the lack of smoke drift in the area. EPA monitored for VOCs, H_2S, O_2, LEL, and sulfur dioxide (SO_2) using a RAE Systems AreaRAE Steel PID and H_2SO_4 concentrations using a SPM Flex (see Table 1 in Enclosure 2). EPA tasked START to replace the CO sensor with the SO_2 sensor prior to beginning monitoring activities. After 2135 hours on April 29, 2019, EPA discontinued monitoring SO_2 levels as the SO_2 sensor appeared to be faulty.

START compared the mobile and stationary ambient air quality readings for VOCs, CO, SO_2, H_2S, and H_2SO_4 to the EPA Acute Exposure Guideline Levels (AEGL), Table 3 – Chemical Plant (Fire), Level 1 (AEGL-1), 1-Hour, action levels, 2012. The AEGLs are used when there are accidental releases of chemicals into the air, expressed as specific concentrations of airborne chemicals at which health effects may occur, and are designed to protect the elderly and children, and any other individuals who may be susceptible to exposure. Level 1 refers to the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects; however, the effects are not disabling and are transient and reversible upon cessation of exposure. Results of the mobile and stationary air monitoring indicated the following:

- Mobile air monitoring results for H_2SO_4 collected at the Hicks Grove Baptist Church on April 29, 2019, at 0700 hours, exceeded the AEGL for that period, but remained below the AEGL for the period average.
- The stationary air monitoring results for H_2SO_4 collected on April 29, 2019, from 2015 to 2040 hours, exceeded the AEGL, but remained below the AEGL for the period average.
- The stationary air monitoring results for SO_2 collected from April 29 through April 30, 2019, exceeded the AEGL period average.
- Mobile and stationary air monitoring results for CO, VOCs, and H_2S were below the AEGL.

START compared the mobile and stationary ambient air quality readings for O_2 and LEL to the U.S. Department of Labor (DOL), Occupational Safety and Health Administration (OSHA), 29 Code of Federal Regulation (CFR), 1910.146, Permit-required Confined Spaces (29 CFR 1910.146). Results of the mobile and stationary air monitoring for O_2 and LEL met the requirements of 29 CFR 1910.146.

See Tables 1 and 2 in Enclosure 2 for a summary of air monitoring results.

RESPONSE ACTIVITIES – SURFACE WATER SAMPLING

On April 29, 2019, EPA tasked START with collecting surface water samples from the Broad River and the stormwater retention pond located at the northern side of the AZP facility (see Figure 4 in Enclosure 1). START collected four surface water samples and three quality assurance/quality control samples from the following locations:

- Sample AZP-SW-01-042919, including the matrix spike and matrix spike duplicate, was collected approximately 50 feet upstream from the Broad River and site outfall mixture point.
- Sample AZP-SW-02-042919 was collected approximately 50 feet downstream from the Broad River and site outfall mixture point.
- Sample AZP-SW-03-042919 and duplicate sample AZP-SW-03-042919-DUP were collected at the Broad River and site outfall mixture point.
- Sample AZP-SW-04-042919 was collected from the site outfall discharge point within the stormwater retention pond.

Surface water sampling was conducted in accordance with EPA Region 4 Science and Ecosystem Support Division (SESD) Operating Procedure, SESDPROC-201-R4, Surface Water Sampling, dated December 16, 2016.

On April 30, 2019, START delivered the surface water samples to Analytical Environmental Services, Inc. (AES) located in Atlanta, Georgia, for analysis of pH and target analyte list (TAL) metals. Laboratory analytical results indicated the pH levels ranged from 7.09 to 7.44 and the following TAL metals were detected: aluminum, antimony, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc. Analytical results were provided to NC DEQ Water Resources for further evaluation at the request of EPA.

DEMOBILIZATION

On April 30, 2019, EPA and CTEH presented air monitoring data to the UC showing air quality throughout the community had returned to background levels. After the data was reviewed by State of North Carolina and local health departments, RCEM lifted the residential evacuation. CTEH indicated they would continue air monitoring throughout the cleanup process. EPA turned over the remaining cleanup activities to NC DEQ. EPA and START demobilized from the site.

If you have any questions or need additional copies of this report, please call me at (678) 775-3081.

Sincerely,

Paul E. Prys II
START IV Project Manager

Andrew F. Johnson
START IV Program Manager

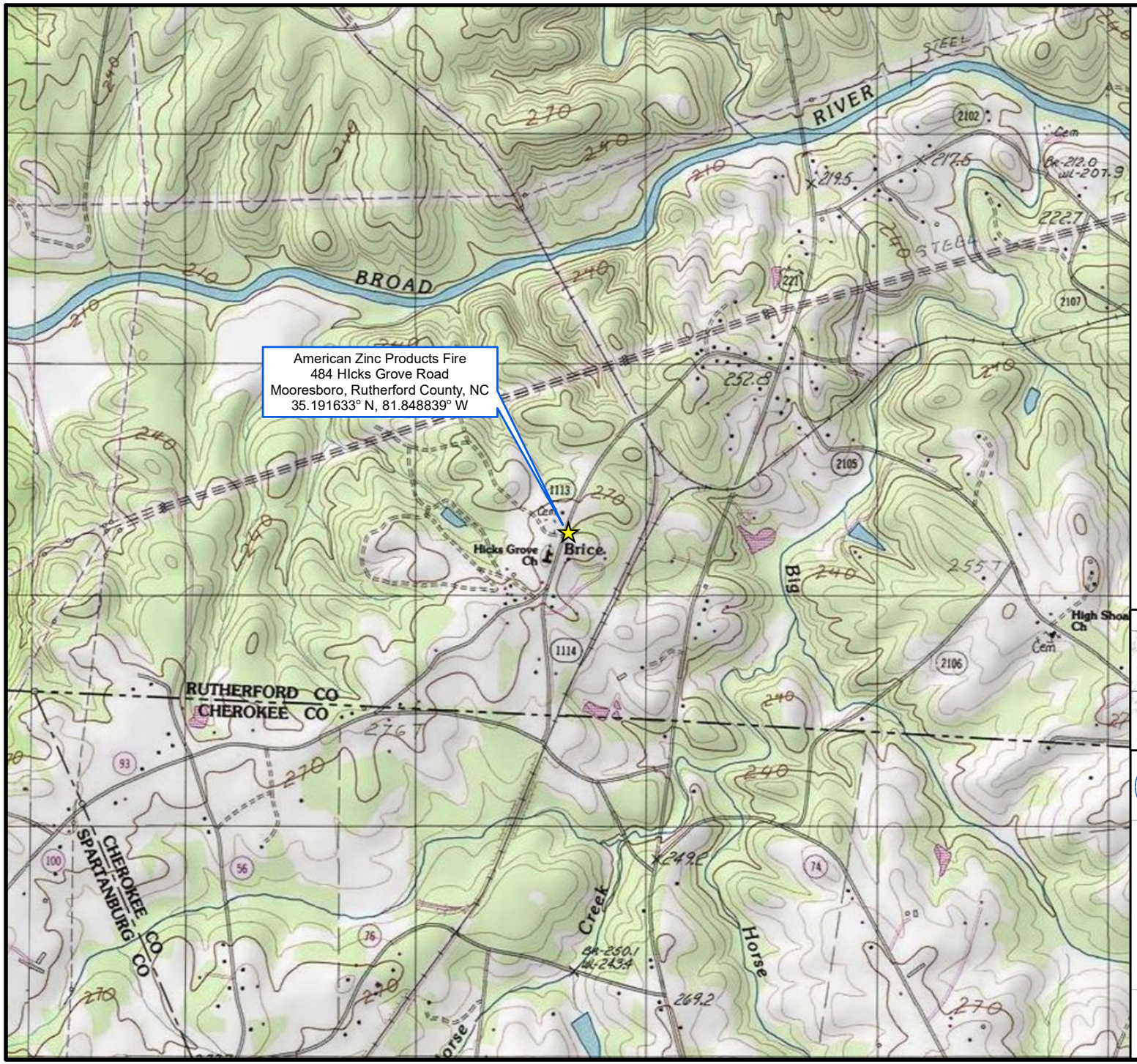
Enclosures (5)

cc: Katrina Jones, EPA Project Officer
Angel Reed, START IV Document Control Coordinator

ENCLOSURE 1

FIGURES

(Four Pages)



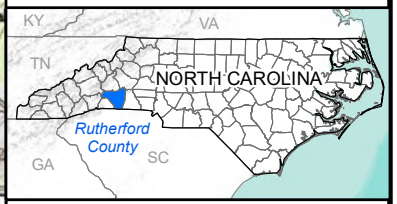
Legend

site_location_point

N
W E
S

0 1,000 2,000
Feet

Map Sources:
USGS Topographic Quadrangle,
Chesnee, NC 1983.



United States Environmental Protection Agency
Region 4

FIGURE 1

Site Location

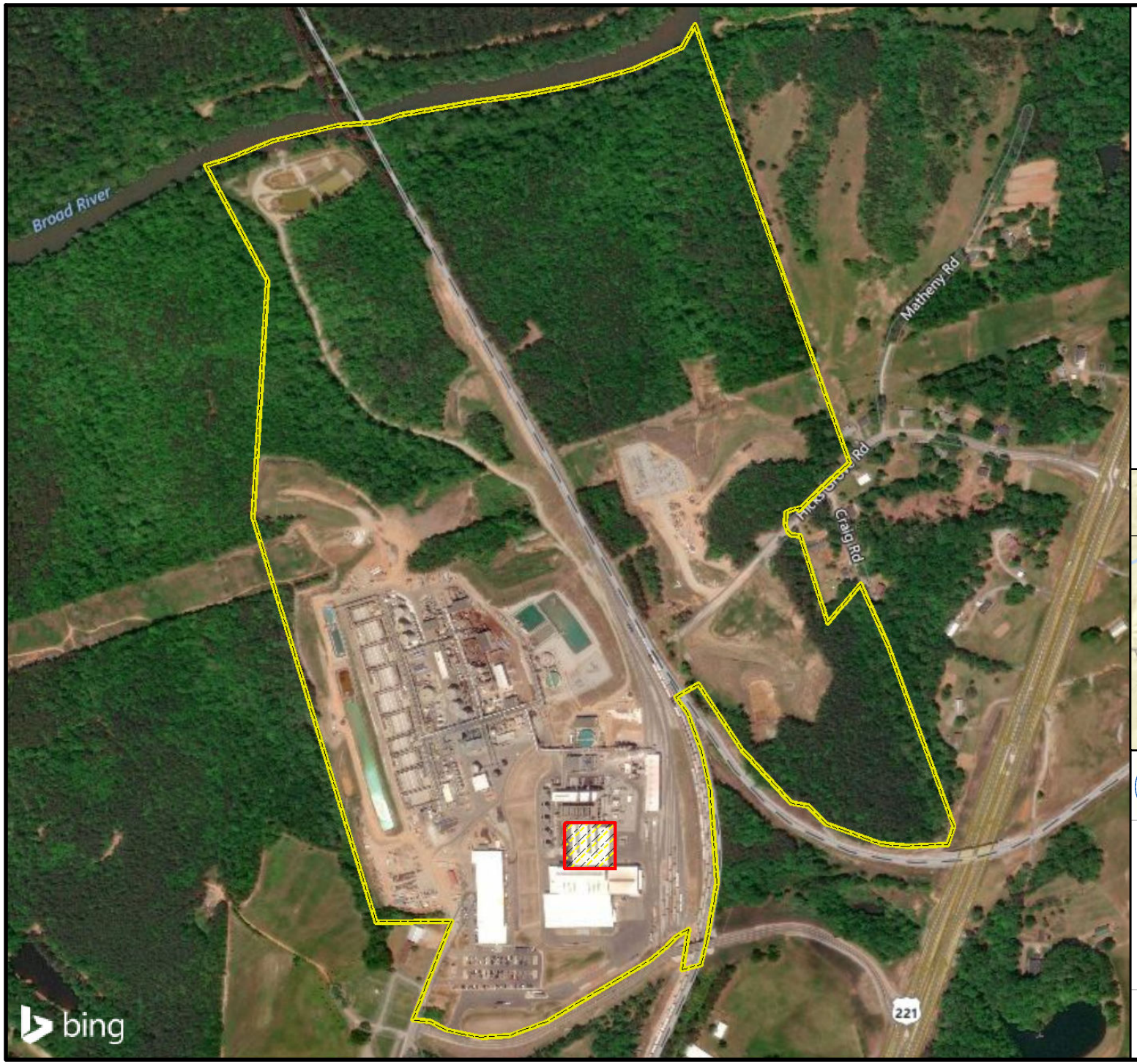
TDD Name: American Zinc Products Fire
TDD No.: TT-01-116

City:	County:	State:
Mooresboro	Rutherford	North Carolina

TETRA TECH

Date: 5/31/2019
Analyst: dale.vonbusch

File: C:\TT-01-116_American_Zinc_Products\mxd\site_location.mxd



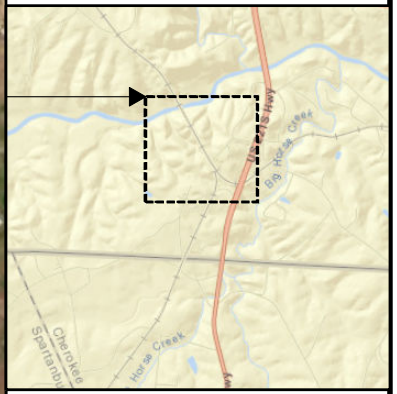
Legend

- Extent of the facility that caught fire
- Site Boundary

N
W E
S

0 300 600
Feet

Map Sources:
USGS Topographic Quadrangle,
Chesnee, NC 1983.



United States Environmental Protection Agency
Region 4

FIGURE 2

Site Layout

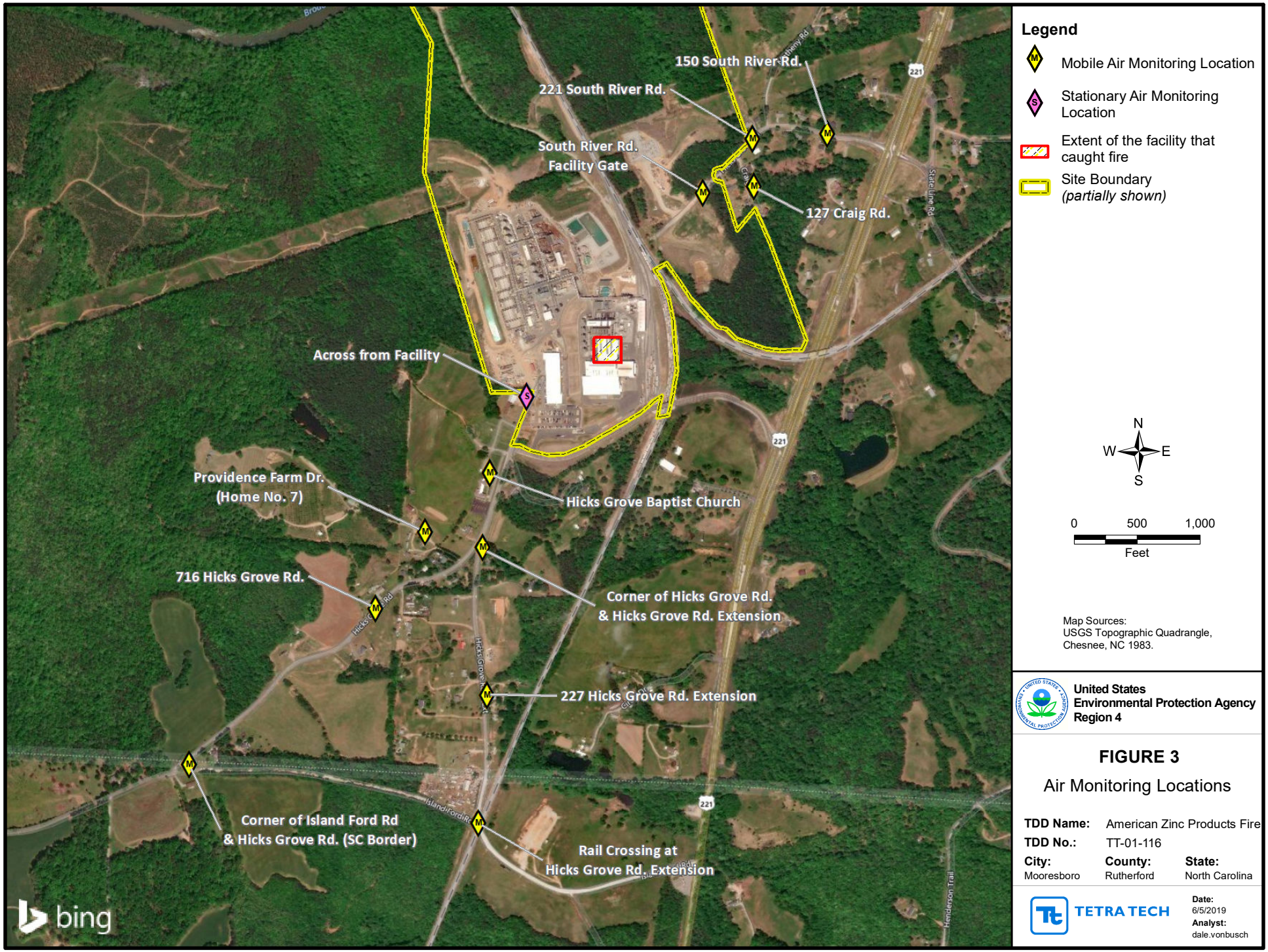
TDD Name: American Zinc Products Fire
TDD No.: TT-01-116

City:	County:	State:
Mooresboro	Rutherford	North Carolina

TETRA TECH

Date: 6/5/2019
Analyst: dale.vonbusch

File: C:\TT-01-116_American_Zinc_Products\mxd\site_layout.mxd



United States Environmental Protection Agency Region 4

FIGURE 3

Air Monitoring Locations

TDD Name: American Zinc Products Fire
TDD No.: TT-01-116
City: Mooresboro **County:** Rutherford **State:** North Carolina

TETRA TECH

Date: 6/5/2019
Analyst: dale.vonbusch

File: C:\TT-01-116_American_Zinc_Products\mxd\air_monitoring_locations.mxd

Legend

W Surface Water Sample

N
W E
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0 50 100
Feet

Map Sources:
ESRI World Imagery, 2015.

United States Environmental Protection Agency Region 4

FIGURE 4

Surface Water Sample Locations

TDD Name: American Zinc Products Fire
TDD No.: TT-01-116

City:	**County:**	**State:**
Mooresboro	Rutherford	North Carolina

TETRA TECH

Date: 5/31/2019
Analyst: dale.vonbusch

File: C:\TT-01-116_American_Zinc_Products\mxd\surface_water_locations.mxd

ENCLOSURE 2

TABLES

(Five Pages)

TABLE 1
MOBILE AIR MONITORING SUMMARY TABLE
AMERICAN ZINC PRODUCTS FIRE
MOORESBORO, RUTHERFORD COUNTY, NORTH CAROLINA

Hicks Grove Baptist Church							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	6	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	2	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	6	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	6	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	6	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	6	3	0 - 58 ppb	12.3 ppb	50 ppb[a]

Providence Farm Drive (Home No. 7)							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	6	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	2	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	6	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	6	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	6	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	6	2	0 - 36 ppb	7 ppb	50 ppb[a]

716 Hicks Grove Road							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	6	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	2	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	6	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	6	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	6	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	6	1	0 - 26 ppb	4.3 ppb	50 ppb[a]

Corner of Island Ford Road & Hicks Grove Road (South Carolina Border)							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	6	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	2	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	6	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	6	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	6	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	6	2	0 - 6 ppb	1.8 ppb	50 ppb[a]

Rail Crossing at Hicks Grove Road Extension							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	6	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	2	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	6	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	6	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	6	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	6	1	0 - 5 ppb	0.8 ppb	50 ppb[a]

TABLE 1
MOBILE AIR MONITORING SUMMARY TABLE
AMERICAN ZINC PRODUCTS FIRE
MOORESBORO, RUTHERFORD COUNTY, NORTH CAROLINA

227 Hicks Grove Road Extention							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	6	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	2	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	6	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	6	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	6	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	6	0	0 ppb	0 ppb	50 ppb[a]

Corner of Hicks Grove Road & Hicks Grove Road Extension							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	6	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	2	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	6	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	6	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	6	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	6	3	0 - 34 ppb	7.3 ppb	50 ppb[a]

150 South River Road							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	5	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	1	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	5	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	5	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	5	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	5	0	0 ppb	0 ppb	50 ppb[a]

221 South River Road							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	1	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	1	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	1	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	1	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	1	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	1	0	0 ppb	0 ppb	50 ppb[a]

South River Road Facility Gate							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	5	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	1	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	5	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	5	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	5	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	5	3	0 - 10 ppb	4.2 ppb	50 ppb[a]

TABLE 1
MOBILE AIR MONITORING SUMMARY TABLE
AMERICAN ZINC PRODUCTS FIRE
MOORESBORO, RUTHERFORD COUNTY, NORTH CAROLINA

127 Craig Road							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
MultiRAE Pro / AreaRAE Steel	VOC	No	1	0	0 ppm	0 ppm	1 ppm[a]
	CO	No	1	0	0 ppm	0 ppm	83 ppm[a]
	H_2S	No	1	0	0 ppm	0 ppm	0.51 ppm[a]
	O_2	No	1	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	1	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	1	0	0 ppb	0 ppb	50 ppb[a]

Notes:

[a]: U.S. Environmental Protection Agency, Acute Exposure Guideline Levels, Table 3 - Chemical Plant (Fire), Level 1, 1-Hour, dated 2012
[b]: U.S. Occupational Safety and Health Adminstrations, 29 CFR 1910.146, Permit-required Confined Spaces

<: Less than
>: Greater than
%: Percent
ACGIH: American Conference of Governmental Industrial Hygienists
AEGL: Acute Exposure Guideline Levels
CO: Carbon monoxide
CFR: Code of Federal Regulation
H_2S: Hydrogen sulfide
LEL: Lower explosive limit
O_2: Oxygen
OSHA: Occupational Safety and Health Administration
ppb: Parts per billion
ppm: Parts per million
SPM: Single Point Monitor
VOC: Volatile organic compounds

TABLE 2
STATIONARY AIR MONITORING SUMMARY TABLE
AMERICAN ZINC PRODUCTS FIRE
MOORESBORO, RUTHERFORD COUNTY, NORTH CAROLINA

Fire Station Adjacent to American Zinc Products Entrance							
Instrument	**Analyte**	**Period Average Exceedances**	**Number of Readings**	**Number of Detections**	**Concentration Range**	**Period Average**	**Action Level (AEGL-1/OSHA)**
AreaRAE	VOC	No	770	549	0 - 0.5 ppm	0.17 ppm	1 ppm[a]
	SO_2	No	770	768	0 - 6.9 ppm	1.77 ppm	20 ppm[a]
	H_2S	No	770	17	0 - 0.2 ppm	0.002 ppm	0.5 ppm[a]
	O_2	No	770	0	20.9%	20.9%	<19.5 or >23%[b]
	LEL	No	770	0	0%	0%	10%[b]
SPM Flex	Sulfuric Acid	No	7876	6307	0 - 89 ppb	24.3 ppb	50 ppb[a]

Notes:

[a]: U.S. Environmental Protection Agency, Acute Exposure Guideline Levels, Table 3 - Chemical Plant (Fire), Level 1, 1-Hour, dated 2012

[b]: U.S. Occupational Safety and Health Adminstrations, 29 CFR 1910.146, Permit-required Confined Spaces

<: Less than

>: Greater than

%: Percent

ACGIH: American Conference of Governmental Industrial Hygienists

AEGL: Acute Exposure Guideline Levels

H_2S: Hydrogen sulfide

LEL: Lower explosive limit

O_2: Oxygen

OSHA: Occupational Safety and Health Administration

ppb: Parts per billion

ppm: Parts per million

SO_2: Sulfur dioxide

SPM: Single Point Monitor

VOC: Volatile organic compounds

TABLE 3
ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES
AMERICAN ZINC PRODUCTS FIRE
MOORESBORO, RUTHERFORD COUNTY, NORTH CAROLINA

Analyte	AZP-SW-01-042919 Broad River - Upstream	AZP-SW-02-042919 Broad River - Downstream	AZP-SW-03-042919 Outfall and Broad River Mixture Point	AZP-SW-03-042919-DUP Outfall and Broad River Mixture Point	AZP-SW-04-042919 Stormwater Basin Outfall
pH					
pH	**7.35 J**	**7.41 J**	**7.42 J**	**7.44 J**	**7.09 J**
Metals (mg/L)					
Aluminum	**0.439**	**0.597**	**0.482**	**0.528**	**1.24**
Antimony	0.0200 U	0.0200 U	0.0200 U	0.0200 U	**0.111**
Barium	**0.0164 J**	**0.0175 J**	**0.0168 J**	**0.0167 J**	**0.0060 J**
Cadmium	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0808
Calcium	**2.62**	**2.71**	**2.72**	**2.60**	**84.5**
Chromium	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0104
Cobalt	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0301
Copper	0.0100 U	0.0100 U	0.0100 U	0.0100 U	**0.417**
Iron	**0.467**	**0.612**	**0.495**	**0.553**	**1.31**
Lead	0.0100 U	0.0100 U	0.0100 U	0.0100 U	**0.0246**
Magnesium	**1.11**	**1.16**	**1.15**	**1.12**	**6.87**
Manganese	**0.0226**	**0.0270**	**0.0230**	**0.0232**	**105**
Nickel	0.0200 U	0.0200 U	**0.0062 J**	0.0200 U	**0.138**
Potassium	**0.959**	**1.00**	**0.984**	**0.938**	**23.4**
Selenium	0.0200 U	0.0200 U	0.0200 U	0.0200 U	**0.0186 J**
Silver	0.0100 U	0.0100 U	0.0100 U	0.0100 U	**0.0085 J**
Sodium	**2.05**	**2.11**	**2.11**	**2.00**	**6500**
Thallium	0.0200 U	0.0200 U	0.0200 U	0.0200 U	**0.0104 J**
Vanadium	0.0100 U	0.0100 U	0.0100 U	0.0100 U	**0.0275**
Zinc	0.0200 U	0.0200 U	0.0200 U	0.0200 U	**247**

Notes:

Bold: Indicates analyte was positively identified at the associated value.
AZP: American Zinc Products
DUP: Duplicate sample
EPA: Enviromental Protection Agency
J: The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample.
mg/L: Milligrams per liter
SW: Surface water sample
U: The analyte was not detected at or above the associated value reporting limit (RL)

ENCLOSURE 3

PHOTOGRAPHIC LOG OF RESPONSE ACTIVITIES

(Six Pages)

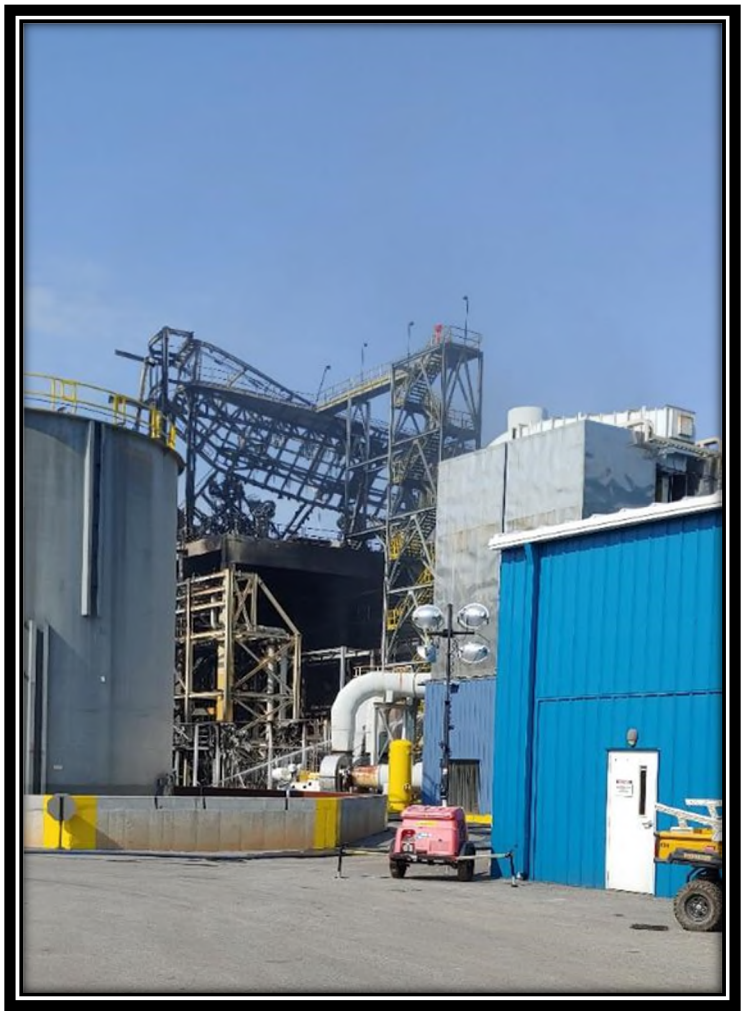
OFFICIAL PHOTOGRAPH NO. 1
U.S. ENVIRONMENTAL PROTECTION AGENCY

TDD Number:	TT-01-116	**Location:**	American Zinc Products Fire
Orientation:	East	**Date:**	April 29, 2019
Photographer:	Paul Prys, Tetra Tech, Inc. (Tetra Tech)	**Witness:**	Adam Acker, Tetra Tech
Subject:	On April 28, 2019, U.S. Environmental Protection Agency (EPA), Region 4 and Superfund Technical Assessment and Response Team (START) personnel responded to American Zinc Products (AZP) facility fire, located at 484 Hicks Grove Road, Mooresboro, Rutherford County, North Carolina.		

OFFICIAL PHOTOGRAPH NO. 2
U.S. ENVIRONMENTAL PROTECTION AGENCY

TDD Number:	TT-01-116	**Location:**	American Zinc Products Fire
Orientation:	Northwest	**Date:**	April 29, 2019
Photographer:	Adam Acker, Tetra Tech	**Witness:**	Paul Prys, Tetra Tech

Subject: Local firefighters used approximately three million gallons of water to conduct fire suppression activities.



OFFICIAL PHOTOGRAPH NO. 3
U.S. ENVIRONMENTAL PROTECTION AGENCY

TDD Number:	TT-01-116	**Location:**	American Zinc Products Fire
Orientation:	Northeast	**Date:**	April 29, 2019
Photographer:	Paul Prys, Tetra Tech	**Witness:**	Adam Acker, Tetra Tech

Subject: By the afternoon of April 29, 2019, firefighters extinguished most of the fire and continued to address the small smoldering fires remaining inside of the facility.

OFFICIAL PHOTOGRAPH NO. 4
U.S. ENVIRONMENTAL PROTECTION AGENCY

TDD Number:	TT-01-116	**Location:**	American Zinc Products Fire
Orientation:	Southwest	**Date:**	April 29, 2019
Photographer:	Paul Prys, Tetra Tech	**Witness:**	Adam Acker, Tetra Tech

Subject: Tetra Tech START conducted mobile air monitoring at eleven residential locations upwind and downwind of the site. Tetra Tech START monitored airborne concentrations of volatile organic compounds (VOCs), hydrogen sulfide (H_2S), carbon monoxide (CO), oxygen (O_2), and the lower explosive limit (LEL) using a RAE Systems MultiRAE Pro photoionization detector (PID) and sulfuric acid (H_2SO_4) concentrations using a Honeywell Single Point Monitor (SPM) Flex Chemcassette Tape-Based Gas Detector.

OFFICIAL PHOTOGRAPH NO. 5
U.S. ENVIRONMENTAL PROTECTION AGENCY

TDD Number:	TT-01-116	**Location:**	American Zinc Products Fire
Orientation:	Northeast	**Date:**	April 29, 2019
Photographer:	Kevin Eichinger, EPA	**Witness:**	Paul Prys, Tetra Tech

Subject: From the evening of April 29 to the early morning of April 30, 2019, EPA and Tetra Tech START conducted stationary air monitoring at the fire station adjacent to and downwind of the AZP facility. EPA and Tetra Tech START monitored airborne concentrations of VOCs, H_2S, O_2, LEL, and sulfur dioxide (SO_2) using a RAE Systems AreaRAE Steel Multi-Gas Monitor PID and H_2SO_4 concentrations using a Honeywell SPM Flex.

OFFICIAL PHOTOGRAPH NO. 6
U.S. ENVIRONMENTAL PROTECTION AGENCY

TDD Number:	TT-01-116	**Location:**	American Zinc Products Fire
Orientation:	North	**Date:**	April 29, 2019
Photographer:	Adam Acker, Tetra Tech	**Witness:**	Paul Prys, Tetra Tech

Subject: Tetra Tech START collected a surface water sample from outfall where the Broad River and neutralized water from the stormwater basin mixed together. In addition to this location, surface water samples were collected from locations 50 feet upstream and downstream of this outfall and from the outfall located inside the stormwater basin. Surface water samples were analyzed for target analyte list (TAL) metals and pH.

ENCLOSURE 4

START LOGBOOK

(Five Pages)

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Logbook 1 of 1

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CONTENTS

PAGE	REFERENCE	DATE

0550 - START Prys and Acker on site to meet with all emergency parties involved at the Floyd Creek Baptist Church at 2004 Chase High Road Forest City, NC.

0600 - START Prys and Acker meet with OSC Rhenne to discuss air monitoring plan. Fire is still actively burning and ½ mile evacuation still in place. START will conduct initial air monitoring on site and at nearby church and neighborhood as well as downwind with AreaRAE Pros and SPM Flex's. Facility is "American Zinc Products"

0700 - START Acker and Prys move to site of fire to conduct initial air monitoring with MultiRAE Pro & Spm Flex on Sulfuric Acid.

0710 - Take reading at Hicks Grove Baptist Church at 35.1897876, -81.8499678
Sulfuric Acid - 146 ppb high - Sustained at 58 ppb
O_2 - 20.9, CO - 0, H_2S - 0.0, VOC - 0, LEL - 0

Location	Sulfuric Acid (PPB)	
① 35.1897876, -81.8499678	58-146	(Church)
② 35.1884822, -81.8516914	36	(716 Hicks Grove)
③ 35.1868108, -81.8527772	26	(Shady Grove)
④ 35.1833833, -81.8579674	~~7~~ 6	(SC Border)
⑤ 35.1821505, -81.8502085	5	(Rail X-ing)
⑥ 35.1849433, -81.8500023	0	(Telephone Pole)

Scale: 1 square = _____

Location	Sulfuric Acid (ppb)	Note
⑦ 35.1881570, -81.8501414	34	Corner of Hicks Grove

0830 - START back to Floyd Creek Baptist Church to meet with OSC Rhenne.

Note: CTEH on site to conduct community air monitoring on behalf of HEPACO and American Zinc Products".

0930 - START Prys & Acker begin round of community rolling air monitoring of sulfuric acid.

Time	Location	Sulfuric Acid Reading (PPB)
0930	1	8
0935	2	6
0945	3	0
0950	4	5
1000	5	0
1005	6	0
1010	7	5

Note: Wind blowing in direction from fire to #1-7. MultiRAE readings all at normal levels.

1020	8 (150 S. River Rd.)	0
1030	9 (221 S. River Rd.)	0
1035	10 (S. River Rd. Gate)	0
1040	11 (171 Craig Rd)	0

Note: American Zinc Products located at 484 Hicks Grove Rd. Mooresboro, NC 28114.

1100 - K. Powell from N. Carolina Public Health on site

Scale: 1 square = _____

Rite in the Rain

with OSC Rhame to discuss plan moving forward. Also representatives from DEQ, Department of Health, ENR. Brent discusses RCRA implications. Waste generated from cell house contained in basement. Will be diluted and sent off accordingly for waste. Storm water pond had low pH of 1-2 overnight and added sodium bicarbonate to neutralize liquid. HEPACO will continue to address runoff overnight. Electrowinning solution composed of 5% zinc and .17% manganese. Storm Water Runoff will be brought back on site up and stored in sludge boxes. SBI also present, and CTEH (Andrew Hennelt). All fire/water suppression being handled on site by HEPACO and prevented from runoff into stormwater pond. Frankie Hunnicutt is current Incident Commander from the county. Fire believed to be related to a 13000 gallon manganese & zinc tank on the outside of the building. 17% sulfuric acid. 4700 gallons in it.

1200 - Meeting with all the stakeholders, will be reconvened at 2:00 pm meeting to discuss evacuation protocols and details with analytical. 3 million gallons of water on fire. 600,000 pounds of sodium bicarbonate.

1400 - All annodes intact following the fire. Which CTEH believes takes the lead aspect out of the realm of testing/analytical.

Scale: 1 square = ______ [signature]

1330 - START Acker and Prys on site at American Zinc Products to collect samples from outfall, river, and storm water basin. Samples info below:

Time	Sample ID	Location
1600	AZP-SW-01-042919 (MS/MSD)	50' Downstream
1607	AZP-SW-02-042919	50' Upstream
1623	AZP-SW-03-042919	Mixture at River
1623	AZP-SW-03-042919-DUP	Mixture at River
1630	AZP-SW-04-042919	Outfall (above)

Note: Samples run for TAL Metals & pH.

SW01 - 35.2006267, -81.8516612
SW02 - 35.2007212, -81.8512861
SW03 - 35.2006771, -81.8514497
SW04 - 35.2004396, -81.8513394

1600 - Attempt to set up VIPER.

1900 - Station set up at firehouse with AreaRAE w/ SO_2 and SPM Flex with Sulfuric Acid.

1910 - Begin logging at fire station. OSC Euelinger will conduct roving air monitoring during night until around midnight with AreaRAE and SPM Flex in communities.

2015 - START Acker and Prys off site.

Note - pH of outfall and river below site Broad River at pH of 7.

Scale: 1 square = ______ [signature]

Tuesday 4/30/19

Weather - Mostly sunny, high of 86°F, low of 61°F. winds at 5-7mph SSW. Chance of rain 10%.

0600 - START Frys and Acker on site at American Zinc Products to pick up overnight air monitoring equipment.

0700 - START the downloaded Air Monitoring data from Firehouse station.

0800 - Meeting at church with Stakeholderes about overnight air monitoring and progress. All water treated on site. No significant readings Inversion occurred around 20:30 previous night and several elevated readings of sulfuric acid up to 89ppb. Still remained below action levels over time.

0900 - START Frys and Acker prepare data summary tables for and Air Monitoring Maps for OSC Exchanger.

1200 - All tables and maps sent to OSC Exchanger

1235 - START Frys and Acker off site. Drive back to Atlanta.

4/30/19

Scale: 1 square =_____

End of Logbook

4/30/19

Scale: 1 square =_____

ENCLOSURE 5

TETRA TECH DATA VALIDATION REPORT

(Seven Pages)

ATTACHMENT 1

LABORATORY DATA PACKAGE

(16 Sheets)